

CLAIMS

1. An X-ray tomograph comprising:

a radiation source and a radiation detector arranged opposite to each other, between which a bed with an examinee placed thereon is provided, said radiation source and radiation detector turning around said bed which can be moved with respect to this go-around axis, radiation irradiated from said radiation source and passing through the examinee being detected using said radiation detector; and

reconfiguration means for creating a three-dimensional tomographic image in a region in concern of the object from the detected projection data,

wherein said reconfiguration means determines for each voxel a projection data range capable of back projection having an operating projection data phase width of 180 degrees or more, superimposes a reconfiguration filter, assigns weights to data of the same phase or opposite phase for each phase for this projection data range and three-dimension back projects this filter-processed projection data over said determined data range capable of back projection along the irradiation trace of the radiation beam.

2. The X-ray tomograph according to claim 1, wherein when determining said data range, a projection data range is determined so that the difference in the absolute values of cone angles at both ends of the projection data range used is reduced.

3. The X-ray tomograph according to claim 2, wherein the projection data phase width used is determined so as to be the same phase width for each voxel.
4. The X-ray tomograph according to claim 1, wherein said projection data range capable of back projection is either 270 degrees or 360 degrees.
5. The X-ray tomograph according to any one of claims 1 to 4, wherein projection data whose number of images taken per rotation is a multiple of the number of sides C of a polygonal display pixel is acquired, and said reconfiguration means comprises back projection means for superimposing said reconfiguration filter on this projection data, grouping data at the same channel position and having projection phases in the go-around direction shifting by $2 N\pi/C$ ($N=1, 2, 3, \dots$) [rad] at a time and performing back projection to a square image array group by group.
6. The X-ray tomograph according to any one of claims 1 to 4, wherein said reconfiguration means converts the projection data obtained to data including fan beam data and parallel beam data whose number of images taken per rotation is a multiple of the number of sides C of a polygonal display pixel, superimposes the filter on this projection data, groups data at the same channel position and having projection phases in the go-around direction shifting by $2N\pi/C$ ($N=1, 2, 3, \dots$) [rad] at a time and performs back

projection to a square image array group by group.

7. The X-ray tomograph according to any one of claims 1 to 6, wherein associating means is provided for associating pixel intervals in the body axis direction of the image using polygonal display pixels with the relative moving speed between the object and said radiation source in the go-around axis direction.

8. The X-ray tomograph according to claim 7, wherein said associating means is constructed so that the relationship between pixel interval $rpitch$ in the body axis direction of said square image and the relative moving speed J in the go-around axis direction of the object and said radiation source is expressed by $J=2 \cdot N \cdot rpitch$ ($N=1, 2, 3 \dots$).

9. The X-ray tomograph according to claims 7 and 8, wherein at the phase of $N\pi$ ($N=1, 2, 3, \dots$) [rad] of the radiation source, the position on the radiation detector at which the beam passing through a voxel I (x, y, Z) whose body axis direction position is Z [mm] and a voxel I ($-x, -y, NJ/2+Z$) whose body axis direction position is $N \cdot J/2+Z$ [mm] intersects remains the same.

10. An X-ray tomograph comprising:

a radiation source and a radiation detector made up of two-dimensionally arranged detection elements, arranged opposite to each other, between which a bed with an examinee placed thereon is provided, said radiation source and radiation detector

turning around said bed which can be moved with respect to this go-around axis, radiation irradiated from said radiation source and passing through said examinee being detected using said radiation detector; and

reconfiguration means for creating a three-dimensional tomographic image in said region in concern of the examinee from the detected projection data,

wherein said reconfiguration means determines a projection data phase range capable of back projection for each reconfigured voxel,

calculates an approximate straight line for a curve indicating the radiation source position with respect to said channel direction position of parallel beam projection data corresponding to said region in concern obtained by a parallel beam of a parallel shape viewed from the go-around axis direction generated from said radiation source,

corrects each row of the projection data by multiplying a coefficient which is dependent on the angle of inclination of radiation from said radiation source,

carries out one-dimensional rearrangement processing for obtaining parallel beam projection data from the fan beam projection data obtained from a fan-shaped fan beam viewed from the go-around axis direction generated from said radiation source, and

superimposes said reconfiguration filter on said parallel projection data to generate filter-

processed parallel projection data, and

three-dimension back projects the parallel beam projection data subjected to said filter processing based on said determined projection data range capable of back projection to the back projection region corresponding to said region in concern along the approximate irradiation trace using said approximate straight line.

11. The X-ray tomograph according to claim 10, wherein said reconfiguration means performs redundancy correction weighting for generating a weighting factor from a weighting function in the phase direction to correct data redundancy at each phase according to the phase width of this determined projection data, and

said parallel beam three-dimensional back projection means assigns the weighting factor obtained by said redundancy correction weighting means to the projection data within said determined projection data phase range and performs three-dimensional back projection along said approximate trace to the back projection region.

12. The X-ray tomograph according to claim 11, wherein in determining said projection data phase range, it is possible to determine the phase range of $f\pi$ [rad] in the view direction and perform redundancy correction using the weighting function by the redundancy correction weighting means.

13. The X-ray tomograph according to claim 10,

wherein said operating data phase range determines the projection data range capable of back projection for each reconfigured voxel so that the maximum cone angle of the beam back projected for each voxel becomes narrowest.

14. The X-ray tomograph according to claim 10, wherein in calculating said operating data phase range, the projection data range capable of back projection for each reconfigured voxel is determined so that the phase direction range of the beam back projected for each voxel is set to the narrowest possible range.